Chronic Wasting Disease (CWD): Background & Update

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What is Chronic Wasting Disease (CWD)?

Nervous system disease

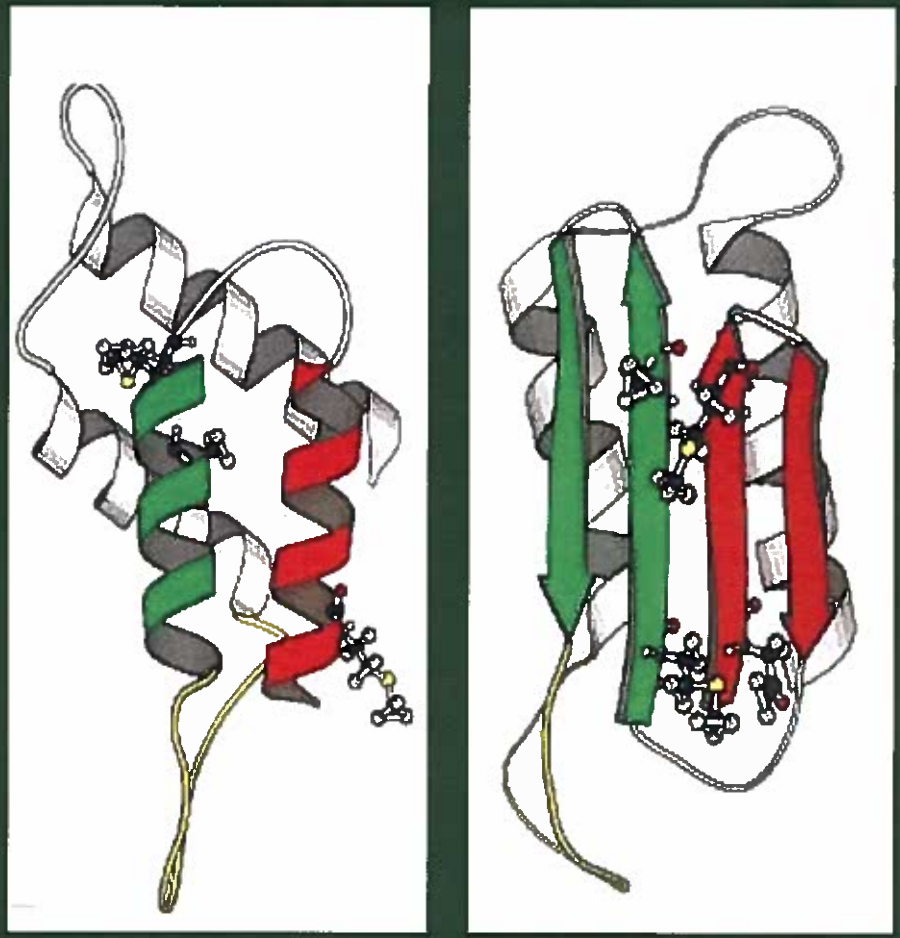
- slowly progressive
- uniformly fatal
- prolonged incubation (>18 mos.)
- Infected animals show no signs at first, but are infectious to others

Species affected:

- white-tailed deer
- mule/black-tailed deer
- elk/red deer
- moose
- others genetically susceptible (e.g. caribou)

What causes CWD?: Prion

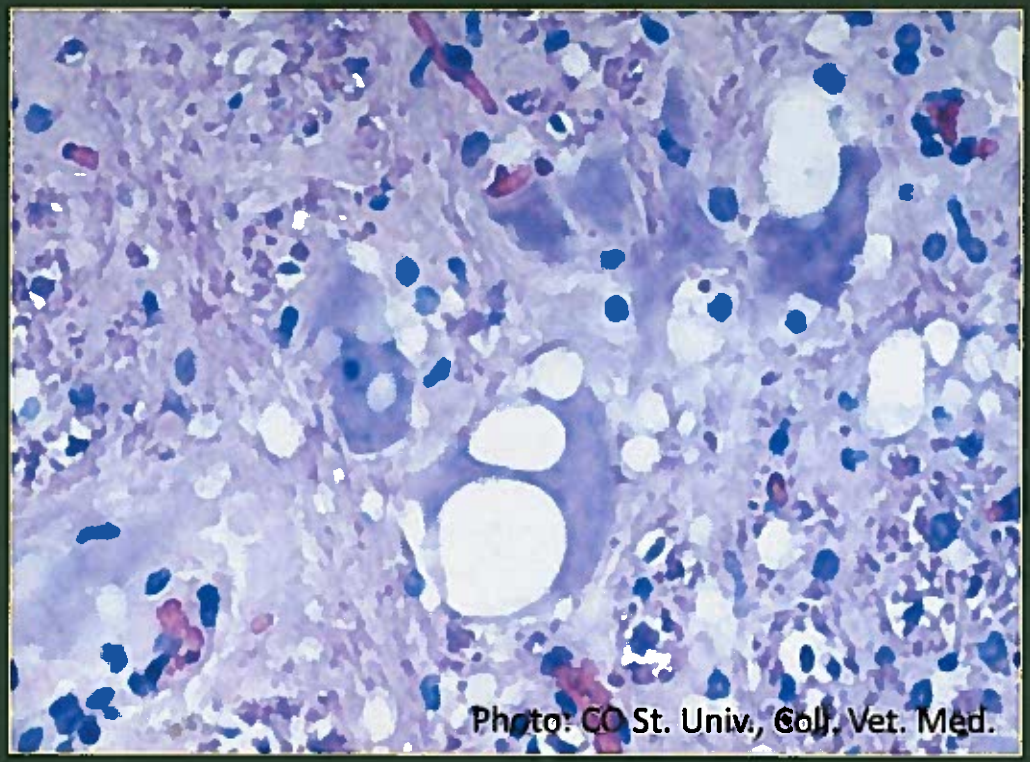
- Mutant versions of normal proteins
- Normal protein undergoes change of shape, becomes:
  - resistant to degradation
  - able to convert normal proteins to mutant form
  - in CWD, contagious



From: Springer-Verlag, © 1996.

Prion Disease = Transmissible Spongiform Encephalopathy (TSE)

- Prions multiply, accumulate & kill nerve cells
- As cells die, creates "holes" in the brain, severe symptoms
- Spongy-looking on microscopic exam
- CWD is related to, but distinct from, other TSEs (Mad Cow Disease, scrapie in sheep, Creutzfeldt-Jakob disease in humans, et al.)



How do infected animals look and act?

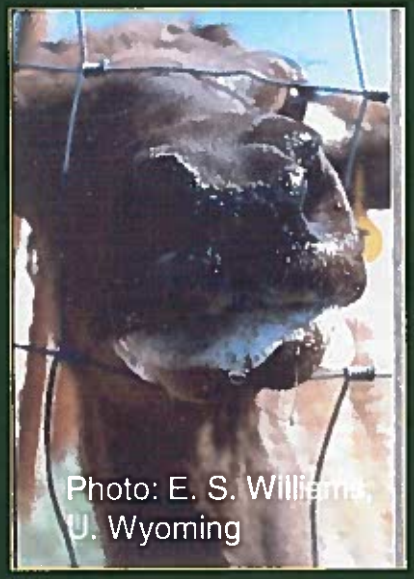
- Few symptoms for first 1.5 years
- Poor body condition
- Abnormal behavior
- Loss of fear of humans
- Drooling
- Isolation
- "Skinny deer you can walk up to"

Photo: Dr. T. Kreeger, Wyoming Fish & Game

Photo: Dr. E. S. Williams, U. Wyoming

How is CWD transmitted?

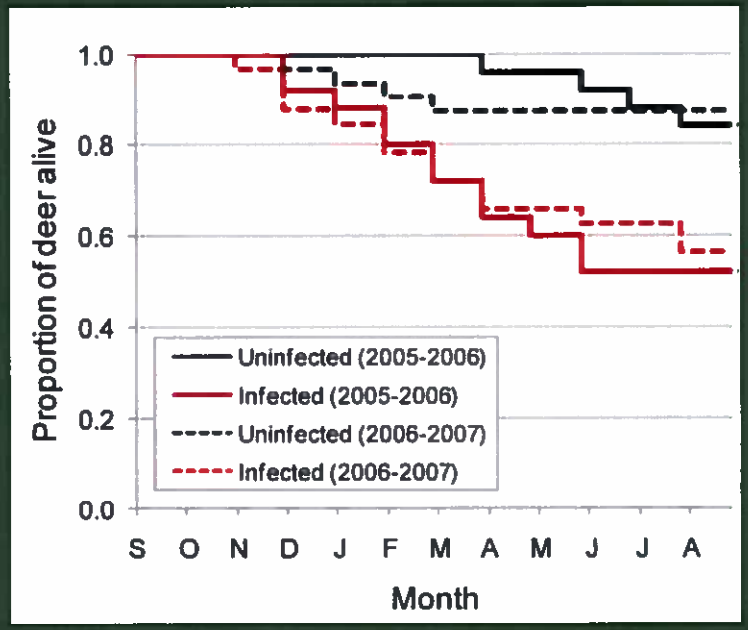
- Direct (animal to animal) or indirect (environment to animal) contact with saliva, feces, urine, +/- blood
- Environmental contamination becomes a huge (the biggest) problem
  - Secretions & carcasses of infected animals contaminate soil, plants
  - Prions bound to soil are more infectious
  - Prions stay infectious in soil for years (e.g. at least 16 yrs for scrapie)
  - Congregating animals (e.g. by baiting, feeding) makes it worse



How does the story end?

- As the % infected grows
  - rising deaths overcome ability of population to replace the dead
  - population declines significantly (over 20-40 yrs)
  - Hunters stop hunting because they don't want to harvest sick deer
  - Ability to manage the disease via hunters is lost
  - Economy, culture based on deer hunting is also lost

Mule deer survival following CWD infection, Boulder, CO



Miller et al., *PLoS One* 3(12):e4019, 12/2008

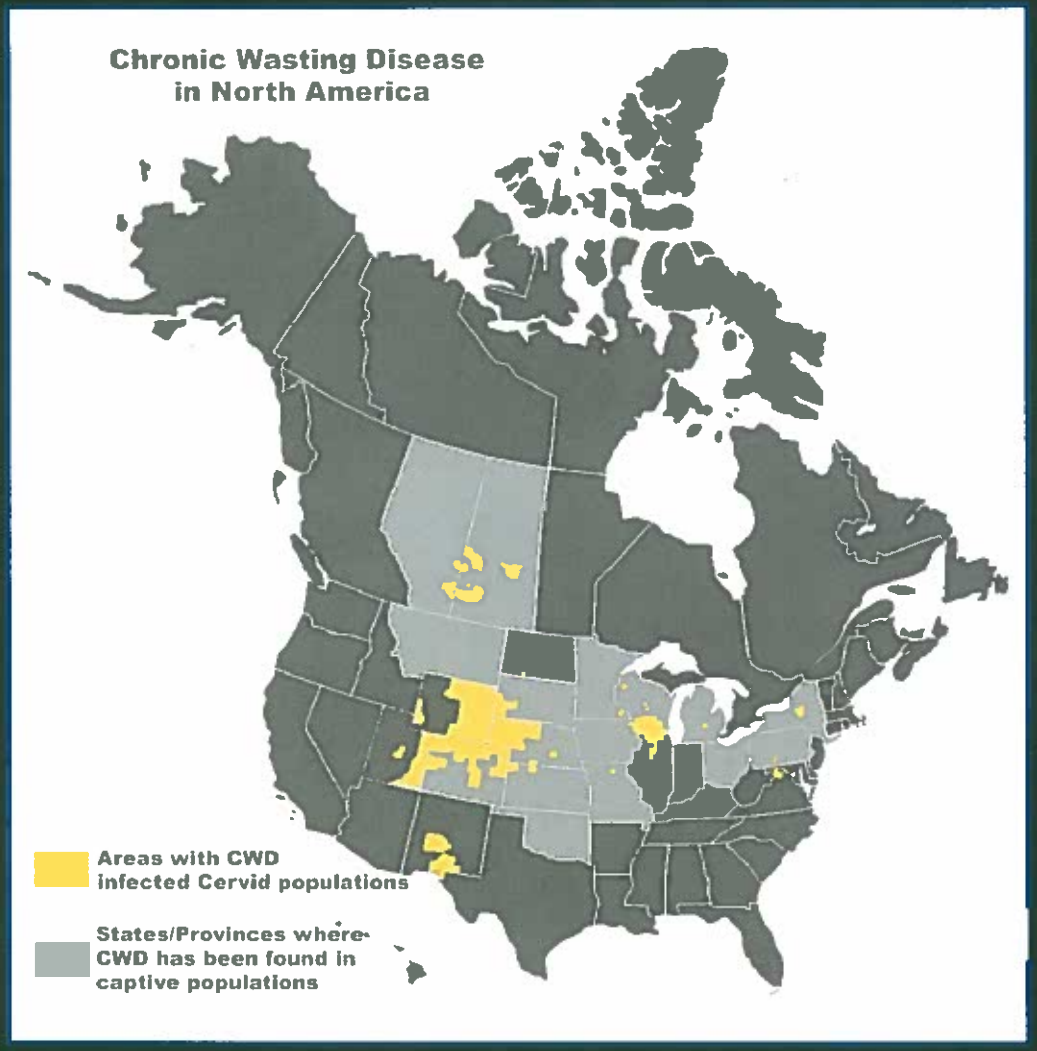
History of CWD

1967: First identified as a clinical disease in captive mule deer, Colorado Division of Wildlife Foothills Research Facility, Fort Collins, CO

1978: Recognized as a TSE by Dr. Beth Williams

2002-present: Beginning with WI, sporadic geographic spread to Midwestern and Eastern states. Continued slow expansion in west.

Current geographic range



Free-ranging wild cervids

20 States

2 Canadian Provinces

Privately-owned/captive cervid facilities

15 States

2 Canadian Provinces

Are other animals (incl. humans) susceptible to CWD?

- Currently no evidence CWD can be transmitted by natural exposure outside deer family
- Currently no evidence CWD can be transmitted to humans (World Health Organization and U.S. Centers for Disease Control & Prevention)
- No human disease attributable to CWD to date; current research suggests transmission to humans, if even possible, is unlikely
- Nevertheless, minimizing human exposure is a common sense precaution

History of the index case

- Since 1998, DNR/MSU have tested >34,000 deer, 1,600 elk and 70 moose prior to the positive deer, all negative.
- DNR Wildlife Disease Lab received confirmation May 20, 2015 from USDA National Veterinary Services Lab of the first CWD-positive wild deer in Michigan.
- Skinny 6 yr old whitetail doe wandering unafraid of humans in a suburban neighborhood in Meridian Township, Ingham County.
- Privately-owned/captive white-tailed doe (Kent County) was positive in 2008.

History of the index case

- Genetic tests at MSU Molecular Ecology Lab suggest the positive wild doe was local

- Deer was infected in or before 2013
- How the doe was infected is unknown; CWD most likely brought in by humans in:
  - infected live deer
  - contaminated carcass

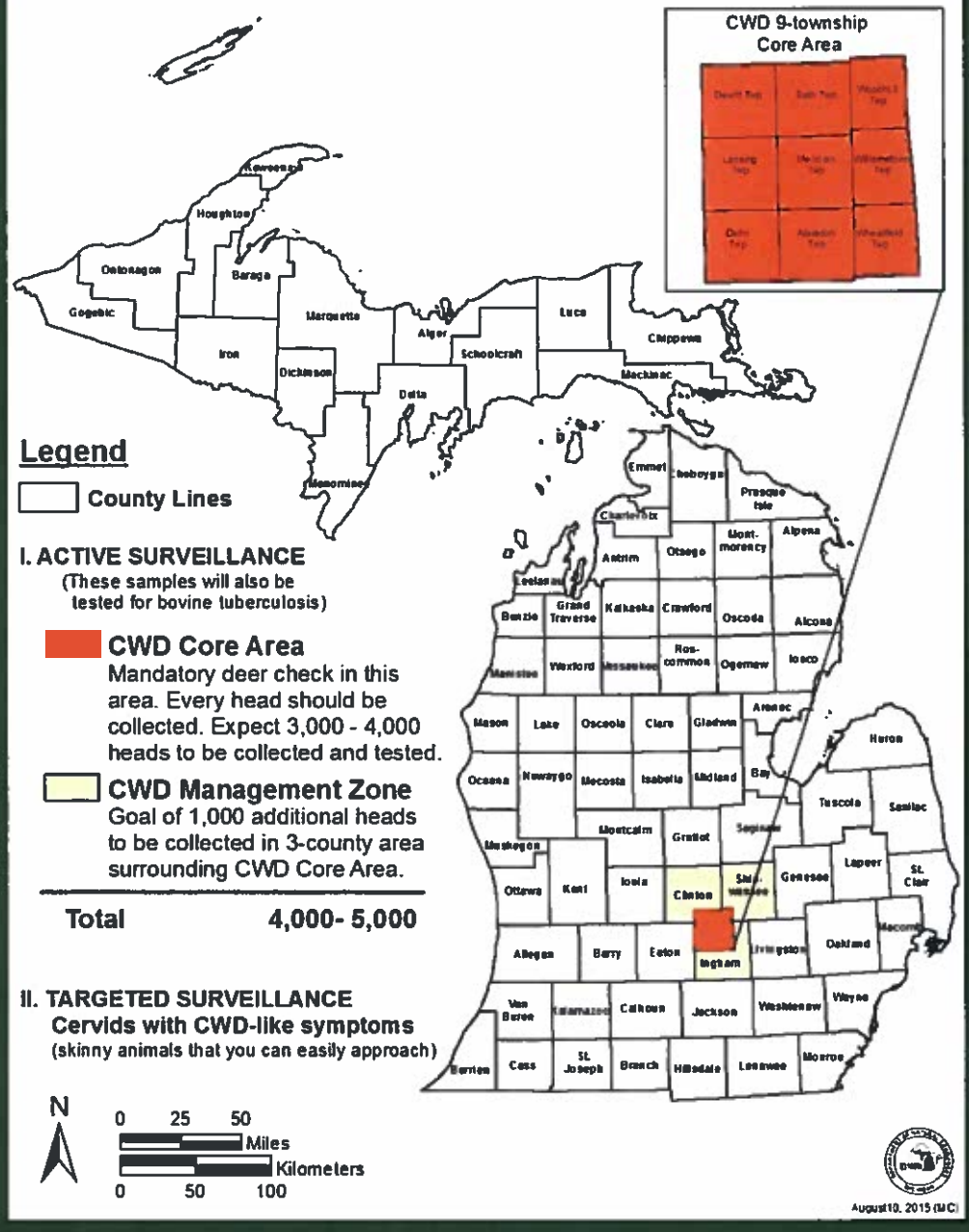
Michigan's CWD Surveillance and Response Plan

Created 2002; updated 2012

Fundamental goals:

1. Early identification of the disease (essential for successful control)
2. Once found, limit further transmission
3. Immediately begin testing deer to determine how much of the deer population is infected and where they are
4. Eradication of CWD if results of surveillance suggest that it is likely to be achievable

2015 Chronic Wasting Disease (CWD) Surveillance Plan for Free-ranging White-tailed Deer



Surveillance results to date, CWD Core Area

- 677 deer tested
- 3 CWD-positive deer found
  - 6 year old female (index case)
  - 2 year old male
  - 5 year old female
- All three collected within 0.8 miles of each other
- Genetic analysis at MSU suggests:
  - all from Meridian Township
  - all members of an extended family group

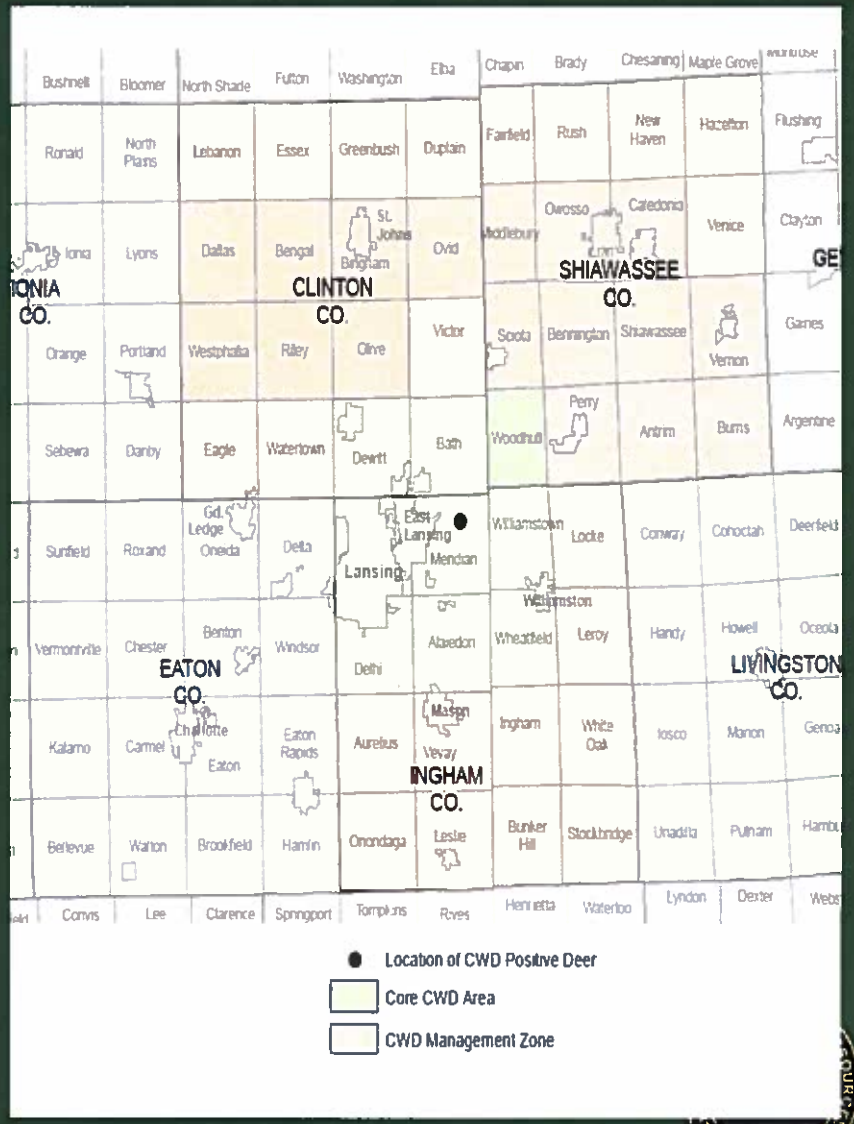
CWD Management Zone

Clinton, Ingham, and Shiawassee Cos.

- Increased hunting opportunity, increase testing
  - Early antlerless season
  - More licenses available
  - Reduced antlerless license cost (40%)
- Ban on baiting and feeding (to decease deer to deer contact, CWD transmission)

DMU 333: Core CWD Area

- Additional measures to increase testing in Meridian and 8 surrounding townships, limit spread
  - Summer sharpshooting by USDA-WS
  - Mandatory deer check
  - Carcass transportation restrictions
  - No salvage of road-killed deer
  - No Antler Point Restriction on second buck license



What Does the Future Hold?

- CWD is nearly impossible to eradicate once established
- Without control, long term impacts that threaten deer, hunting economy are likely
- Hunter and landowner participation necessary, whatever management strategy is ultimately chosen

Many thanks.

www.Michigan.gov/CWD